

SUPER[®]

SUPER P4DC6
SUPER P4DC6+
SUPER P4DC6+II
SUPER P4DCE
SUPER P4DCE+
SUPER P4DCE+II

USER'S MANUAL

Revision 1.2c

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Preface

About This Manual

This manual is written for system integrators, PC technicians and knowledgeable PC users. It provides information for the installation and use of the SUPER P4DC6/P4DC6+/P4DC6+II/P4DCE/P4DCE+/P4DCE+II mainboard. The SUPER P4DC6/P4DC6+/P4DCE/P4DCE+ supports both single and dual Intel® 603-pin Xeon™ 1.40 - 2.40 GHz processors at a front side bus speed of 400 MHz and data channel RAMBUS technology yielding a 3.2 GB data transfer bandwidth. The SUPER P4DC6+II/P4DCE+II supports single and dual Intel® 603-pin Xeon™ processors of up to 2.80 GHz at the same front side bus speed and memory size. Please refer to the motherboard specifications pages on our web site (http://www.supermicro.com/Product_page/product-m.htm) for updates on supported processors. This product is intended to be professionally installed.

Manual Organization

Chapter 1 includes a checklist of what should be included in your mainboard box, describes the features, specifications and performance of the SUPER P4DC6/P4DC6+/P4DC6+II/P4DCE/P4DCE+/P4DCE+II mainboard and provides information about the Intel 860 chipset.

Chapter 2 begins with instructions on handling static-sensitive devices. Read this chapter when you want to install the processors, the RDRAM memory modules into the RIMM slots and for mounting the mainboard in the chassis. Also refer to this chapter when you want to connect floppy/hard disk drives, the IDE or SCSI interfaces, the Adaptec SCSI RAID card, the parallel and serial ports and the twisted wires for the power supply, the reset button, the keylock/power LED and the keyboard.

If you encounter any problems see **Chapter 3**, which describes troubleshooting procedures for the video, the memory and the setup configuration stored in CMOS. For quick reference, a general FAQ (Frequently Asked Questions) section is provided.

Chapter 4 covers the AwardBIOS setup and options.

The **Appendices** list the BIOS POST messages, POST codes and beep codes.

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Chapter 1

Introduction

1-1 Overview

Checklist

Congratulations on purchasing your computer mainboard from an acknowledged leader in the industry. Supermicro mainboards are designed with the utmost attention to detail to provide you with the highest standards in quality and performance.

Please check that the following items have all been included with your motherboard. If anything listed here is damaged or missing, contact your retailer.

One (1) Supermicro mainboard and User's Manual

One (1) ATA66/100 ribbon cable for IDE devices

One (1) floppy ribbon cable

One (1) Supermicro CD (or diskettes) containing drivers and utilities

One (1) Supermicro 50-pin SCSI cable (P4DC6/P4DC6+/P4DC6+II only)

One (1) SCSI Manual (P4DC6/P4DC6+/P4DC6+II only)

Two (2) Supermicro TMR-007 continuity RIMM modules

One (1) I/O shield plate

Two (2) pairs of CPU dual retention clips for heatsink fans

Optional Components

One (1) Supermicro 68-pin LVD Ultra160 SCSI cable (retail option only, P4DC6/P4DC6+/P4DC6+II only)

Two (2) CPU fans (retail option only)

One (1) Supermicro USB cable (retail option only)

Contacting Supermicro

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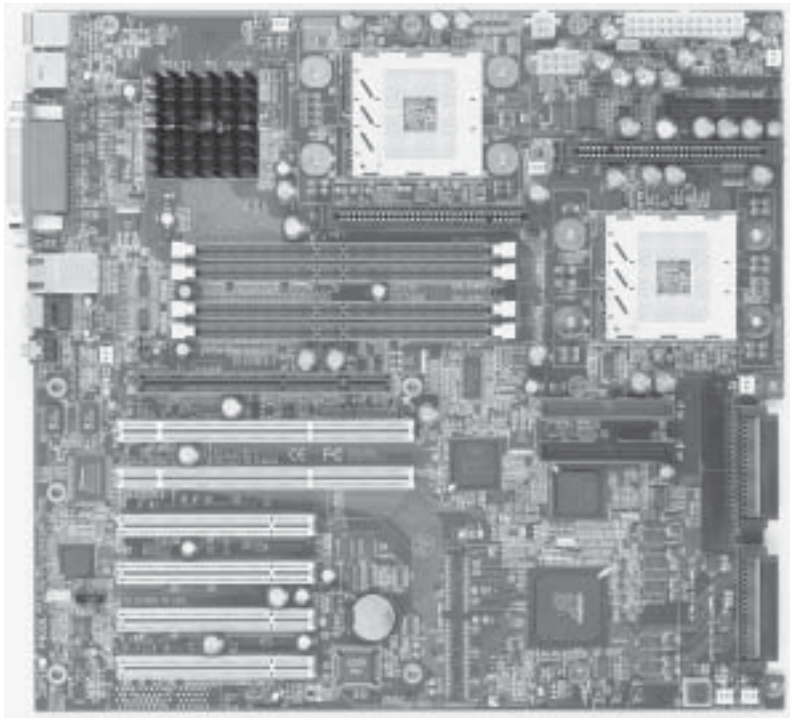
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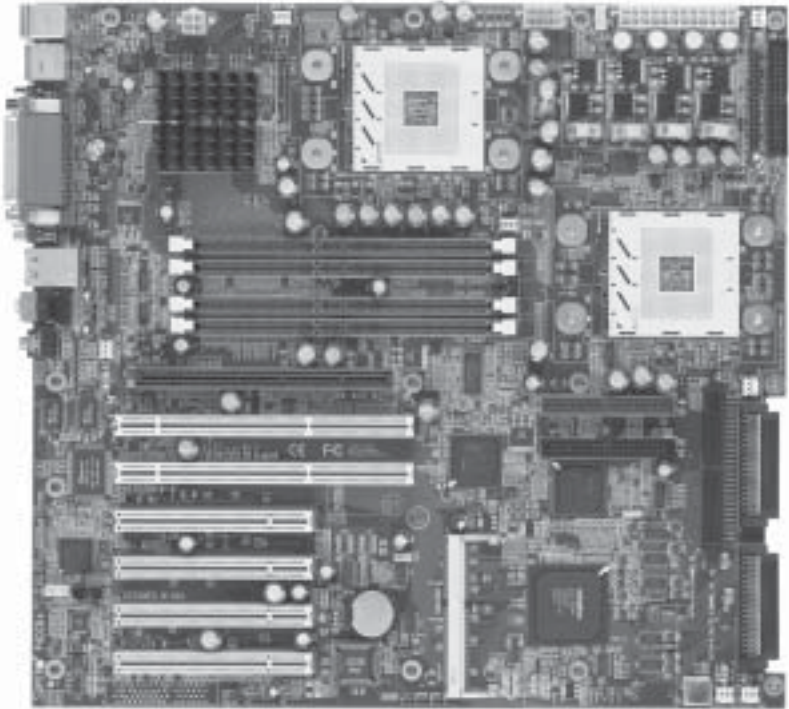
Notes

Figure 1-1. SUPER P4DC6 Image



Note:
- The P4DCE shares the same layout as the P4DC6 but with no onboard SCSI.

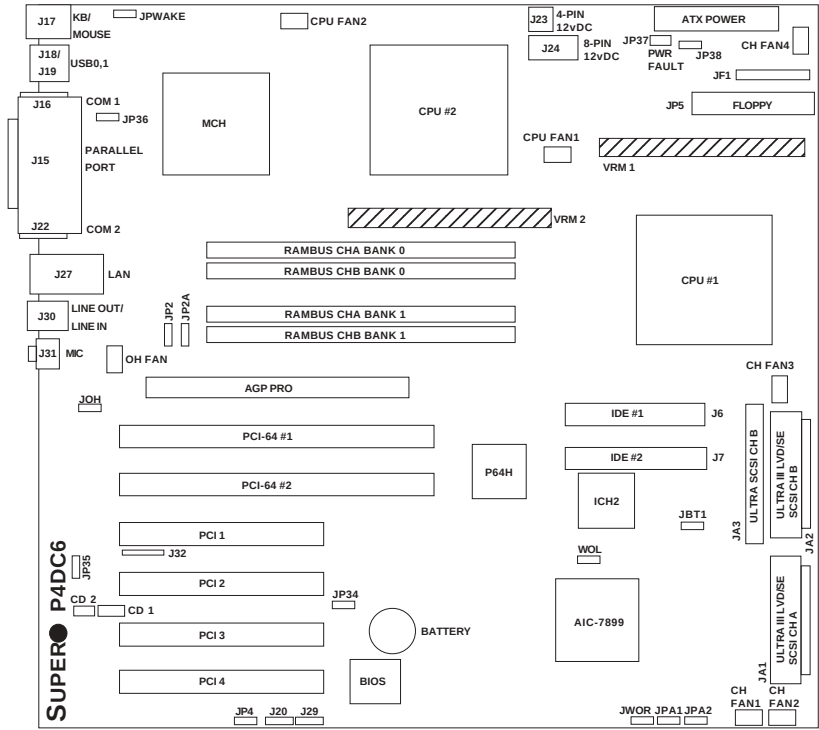
Figure 1-2. SUPER P4DC6+ Image



Notes:

- The P4DCE+ shares the same layout as the P4DC6+ but with no onboard SCSI.
- The P4DC6+II shares the same layout as the P4DC6+ but includes a heatsink over the VRM modules.
- The P4DCE+II shares the same layout as the P4DCE+ but includes a heatsink over the VRM modules.

Figure 1-3. SUPER P4DC6/P4DCE Layout
(not drawn to scale)



Notes: See Chapter 2 for more information on jumper settings and pin definitions. On a 2-pin jumper, "Closed" means the jumper is on both pins and "Open" means the jumper is either off or on one pin only. The P4DCE shares the same layout as the P4DC6 but with no onboard SCSI.

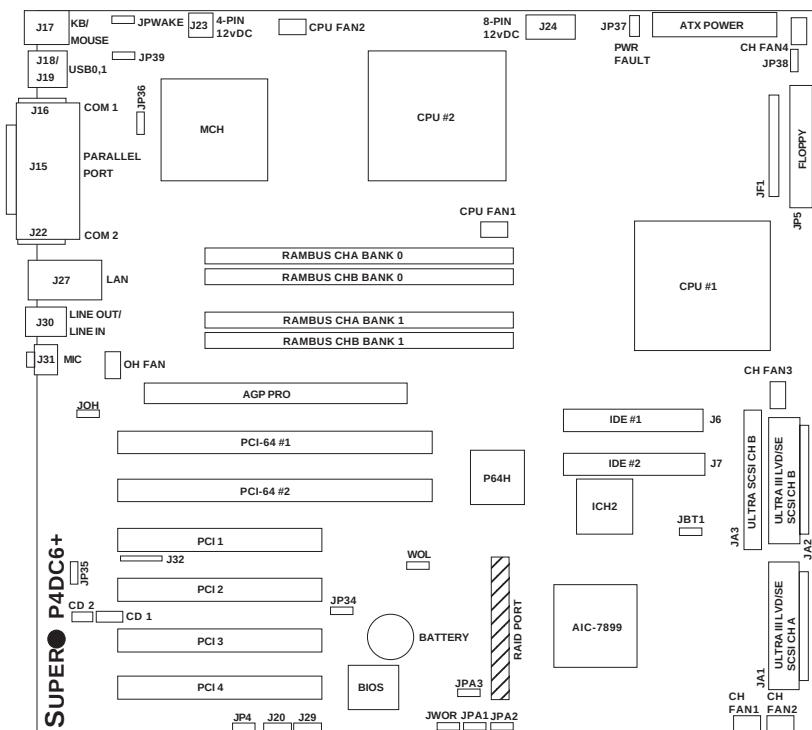
P4DC6/P4DCE Quick Reference

<u>Jumpers</u>	<u>Description</u>	<u>Default Setting</u>
JBT1	CMOS Clear	Pins 1-2 (Normal)
JP2, JP2A	Manufacturer Setting	Pins 1-2 (Auto)
JPA1, JPA2	SCSI Termination	Open (Enabled)
JP4	Onboard Audio	Pins 1-2 (Enabled)
JP34	SCSI Enable/Disable	Pins 1-2 (Enabled)
JP35	LAN Enable/Disable	Pins 1-2 (Enabled)
JP36	Manufacturer Setting	Pins 1-2 (Enabled)
JP38*	Third Power Supply Fail Alarm	Open (Disabled)
JPWAKE	Keyboard Wake Up	Pins 1-2 (Disabled)

<u>Connectors</u>	<u>Description</u>
ATX POWER #1	Primary ATX Power Connector
CD1, CD2	Audio CD Inputs
COM1/COM2	COM1/COM2 Serial Port Connector
CPU1/CPU2	CPU #1 and CPU #2 Sockets
CPU/CH/OH FAN	CPU/Chassis/Overheat Fan Headers
J6, J7	IDE #1, IDE #2 Connector
J15	Parallel (Printer) Port
J16	PS/2 Keyboard/Mouse Connector
J20, J29	USB Headers 3 and 4
J23	4-Pin 12vDC Power Connector
J24	8-Pin 12vDC Power Connector
J27	LAN (Ethernet) Port
J30	Line In/Line Out Jacks
J31	Microphone Jack
J32	Infrared Connector
JA1	Ultra160 LVD SCSI CH A Connector
JA2	Ultra160 LVD SCSI CH B Connector
JA3	Ultra SCSI CH B Connector
JF1	Front Control Panel
JOH	Overheat LED
JP5	Floppy Disk Drive Connector
JP37*	Power Fail Connector
JWOR	Wake-on-Ring Header
LAN	Ethernet Port
USB0, USB1	USB Ports 1 and 2
VRM1/2	Voltage Regulator Module Card Slots

* For use with Supermicro chassis only.

Figure 1-4. SUPER P4DC6+/P4DCE+ Layout
(not drawn to scale)



Note: See Chapter 2 for more information on jumper settings and pin definitions. On a 2-pin jumper, "Closed" means the jumper is on both pins and "Open" means the jumper is either off or on one pin only.

The P4DCE+ shares the same layout as the P4DC6+ but with no onboard SCSI and no RAID port.

The P4DC6+II shares the same layout as the P4DC6+ but includes a heatsink over the VRM modules.

The P4DCE+II shares the same layout as the P4DCE+ but includes a heatsink over the VRM modules. Both "II" models support processors of up to 2.80 GHz.

P4DC6+/P4DCE+ Quick Reference

<u>Jumpers</u>	<u>Description</u>	<u>Default Setting</u>
JBT1	CMOS Clear	Pins 1-2 (Normal)
JPA1, JPA2	SCSI Termination	Open (Enabled)
JPA3	PCI 64 Speed Select	Open (66 MHz)
JP4	Onboard Audio	Pins 1-2 (Enabled)
JP34	SCSI Enable/Disable	Pins 1-2 (Enabled)
JP35	LAN Enable/Disable	Pins 1-2 (Enabled)
JP36	Manufacturer Setting	Pins 1-2 (Enabled)
JP38*	Third Power Supply Fail Alarm	Open (Disabled)
JP39	USB Wake Up	Pins 1-2 (Enabled)
JPWAKE	Keyboard Wake Up	Pins 1-2 (Disabled)

<u>Connectors</u>	<u>Description</u>
ATX POWER #1	Primary ATX Power Connector
CD1, CD2	Audio CD Inputs
COM1/COM2	COM1/COM2 Serial Port Connector
CPU1/CPU2	CPU #1 and CPU #2 Sockets
CPU/CH/OH FAN	CPU/Chassis/Overheat Fan Headers
J6, J7	IDE #1, IDE #2 Connector
J15	Parallel (Printer) Port
J16	PS/2 Keyboard/Mouse Connector
J20, J29	USB Headers 3 and 4
J23	4-Pin 12vDC Power Connector
J24	8-Pin 12vDC Power Connector
J27	LAN (Ethernet) Port
J30	Line In/Line Out Jacks
J31	Microphone Jack
J32	Infrared Connector
JA1	Ultra160 LVD SCSI CH A Connector
JA2	Ultra160 LVD SCSI CH B Connector
JA3	Ultra SCSI CH B Connector
JF1	Front Control Panel
JOH	Overheat LED
JP5	Floppy Disk Drive Connector
JP37*	Power Fail Connector
JWOR	Wake-on-Ring Header
LAN	Ethernet Port
RAID Port	RAID Card Connector
USB0, USB1	USB Ports 1 and 2

* For use with Supermicro chassis only.

Motherboard Features

CPU

- P4DC6/P4DC6+/P4DCE/P4DCE+: Single or dual Intel® Xeon™ 1.40 - 2.40 GHz 603-pin processors at a 400 MHz system bus speed
- P4DC6+II/P4DCE+II: Single or dual Intel® Xeon™ 1.40 - 2.80 GHz 603-pin processors at a 400 MHz system bus speed

Note: - refer to the motherboard specifications pages on our web site for updates on supported processors (http://www.supermicro.com/Product_page/product-m.htm).

Memory

- Four PC600/800 RDRAM RIMM sockets to support up to 2 GB RDRAM

Chipset

- Intel® 860 (82860NB)
- P64H (82806AA PCI-64 Hub)
- ICH2 (82801BA I/O CH, 82802AB Firmware Hub)

Expansion Slots

- One 4xAGP Pro (1.5v only)
- Two 64-bit PCI 66 MHz (3.3v)
- Four 32-bit PCI 33 MHz

BIOS

- 4 Mb Firmware Hub Award® Flash BIOS
- ACPI/APM Power Management
- PAC'99 color-coded I/O connectors
- Internal control of Power-On mode for recovery from AC power loss

PC Health Monitoring

- Nine onboard voltage monitors for two CPU core voltages, two CPU I/O voltages, +3.3v, ±5v, ±12v, 3v battery, and 5v system bus
- Three-fan status monitor with firmware/software on/off control
- Environmental temperature monitor and control
- CPU fan auto-off in sleep mode
- Three CPU/chassis temperature monitors
- System overheat LED and control
- System resource alert
- Chassis intrusion detection
- Auto-switching voltage regulator for the CPU core
- Slow blinking LED for suspend state indicator

- BIOS support for USB keyboard
- CPU slowdown at high temperature

ACPI/PC99 Features

- Microsoft® OnNow
- Real-time clock wake-up alarm
- Main switch override mechanism
- External modem ring-on

Onboard I/O

- AIC-7899 controller for dual channel Ultra160 SCSI (P4DC6, P4DC6+, P4DC6+II only)
- 2 IDE bus master interfaces support up to four UDMA/100 devices
- 1 floppy port interface (up to 2.88 MB)
- 2 Fast UART 16550A compatible serial ports
- 1 EPP/ECP (Enhanced Parallel Port/Extended Capabilities Port)
- PS/2 mouse and PS/2 keyboard ports (1 each)
- 1 Raptor RAID controller (P4DC6+ and P4DC6+II only)
- 1 LAN (Ethernet) port
- 1 infrared port
- 2 USB ports
- 2 USB headers
- 2 SCSI channels
- 1 audio line in
- 1 audio line out
- 1 audio mic in
- 1 CD audio (both types of standard headers provided)

Other

- Internal/external modem ring-on
- Control of recovery from AC power loss
- Wake-on-LAN (WOL)

CD Utilities

- BIOS flash upgrade utility (awdfash.exe)
- Drivers for the Intel® 860 chipset
- Intel® LDCM (retail only)

Dimensions

- Extended ATX: 12" x 13" (304.80 x 330.20 mm)

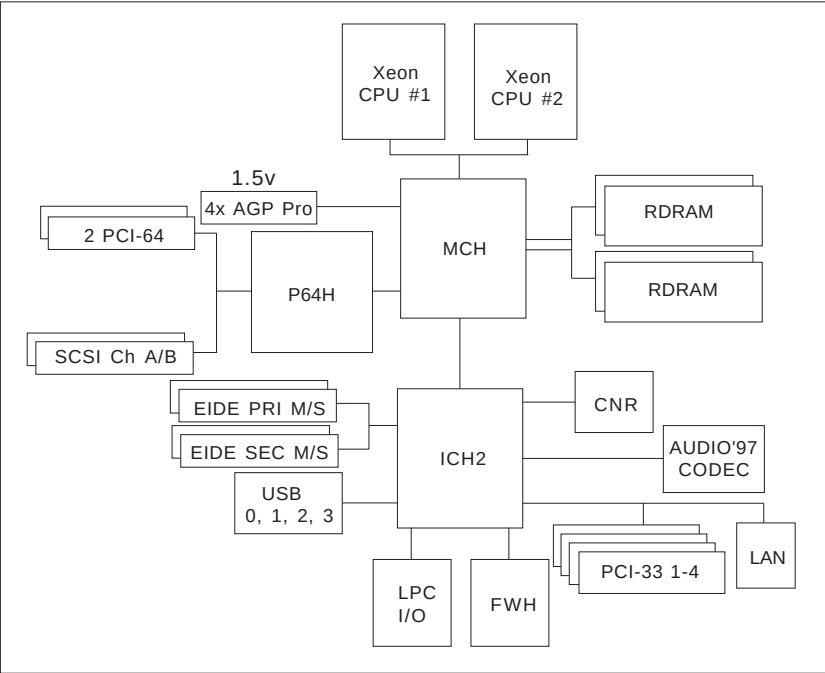


**Figure 1-5. Intel 860 Chipset:
System Block Diagram**

NOTE: This is a general block diagram and may not exactly represent all the features on your motherboard. See the previous section for the actual specifications of each motherboard.

1-2 Chipset Overview

The Intel® 860 chipset is a high performance, cost-effective and energy efficient chipset designed for AGP/PCI/LPC computer systems based on single or dual Intel® Xeon™ 603-pin processors at a 400 MHz Front Side (system) Bus speed.

Intel's 860 chipset consists of three major components: the Memory Controller Hub (MCH), the P64H and the I/O Controller Hub 2 (ICH2).

The MCH is optimized to provide superior performance between single or dual Xeon CPUs and the dual channel RAMBUS memory operating at up to 3.2 GB/s data bus bandwidth. The MCH also supports a 4x AGP Pro accelerated video slot.

The P64H provides support for two PCI-64 slots and two SCSI hard disk drive channels. It interfaces directly with the MCH.

The ICH2 is a highly integrated multifunctional I/O Controller Hub that provides the interface to the PCI Bus and integrates many of the functions needed in today's PC platforms.

Memory Support and AGP

The MCH supports up to 2 GB of RDRAM. The RAMBUS dual channel memory bus can support full duplex memory bandwidth transfers at up to 3.2 GB/s. Different memory module speeds (such as 600 MHz and 800 MHz) should not be mixed. Different RDRAM memory module sizes (such as 256 MB and 512 MB) may be used in Channel A and Channel B, but those within each channel (Bank0 and Bank1) must be the same. The MCH also provides full 4xAGP Pro capability for maximum bus utilization, including 2x and 4x mode transfer rates.

The ICH2 provides extensive I/O support functions and capabilities, which include Rev 2.2 compliant PCI with support for 33 MHz PCI operations, PCI-32 slots, ACPI Power Management Logic Support, an Enhanced DMA Controller, an Interrupt Controller and timer functions, an Integrated IDE controller supporting Ultra ATA100/66/33, a USB host interface with support for four USB ports, two host controllers, an Integrated LAN Controller, a System Management Bus (SMBus) with additional support for I²C devices, an AC97 2.1 Compliant Link for Audio and Telephony codecs, a Low Pin Count (LPC) interface, Firmware Hub (FWH) interface support and Alert On LAN (AOL).

Recovery from AC Power Loss

The BIOS provides a setting that allows you to determine how your system will respond when AC power is lost and then restored. You can choose for the system to remain powered off (in which case you must activate the power switch to turn it back on) or for it to return automatically to a power-on state. See the Power Lost Control setting in the BIOS chapter of this manual to change this setting. The default setting is "Always OFF."

1-3 Special Features

Adaptec Raptor RAID Controller (P4DC6+/P4DC6+II only)

The P4DC6+ and P4DC6+II include a Raptor RAID controller to offer the high degree of fault tolerance required by today's servers. A SO-DIMM socket is included on the motherboard to plug a Raptor adapter card (not included) into, which eliminates the need to use up a PCI slot to have RAID capability. The Raptor RAID controller and adaptor utilizes a 64-bit bus, provides 0, 1, 0/1, 5, and 0/5 RAID levels and supports S.M.A.R.T. and SES/SAF-TE.

1-4 PC Health Monitoring

This section describes the PC health monitoring features of the SUPER P4DC6/P4DC6+/P4DC6+II/P4DCE/P4DCE+/P4DCE+II motherboard.

Nine Onboard Voltage Monitors for the CPU Cores, CPU I/O, +3.3v, ±5v, ±12v, 3v Battery and 5v System Bus

The onboard voltage monitor will scan these nine voltages continuously. Once a voltage becomes unstable, it will give a warning or send an error message to the screen. Users can adjust the voltage thresholds to define the sensitivity of the voltage monitor.

Three-Fan Status Monitor with Firmware/Software On/Off Control

The PC health monitor can check the RPM status of the cooling fans. The onboard 3-pin CPU and chassis fans are controlled by the power management functions. The thermal fan is controlled by the overheat detection logic.

Environmental Temperature Control

The thermal control sensor monitors the CPU temperature in real time and will activate the thermal control fan whenever the CPU temperature exceeds a user-defined threshold. The overheat circuitry runs independently from the CPU. It can continue to monitor for overheat conditions even when the CPU is in sleep mode. Once it detects that the CPU temperature is too high, it will automatically turn the thermal control fan on to prevent any overheat damage to the CPU. The onboard chassis thermal circuitry can monitor the overall system temperature and alert users when the chassis temperature is too high.

CPU Fan Auto-Off in Sleep Mode

The CPU fan activates when the power is turned on. It can be turned off when the CPU is in sleep mode. When in sleep mode, the CPU will not run at full power, thereby generating less heat.

CPU Overheat LED and Control

This feature is available when the user enables the CPU overheat warning function in the BIOS. This allows the user to define an overheat temperature. When this temperature is exceeded, both the overheat fan and the warning LED are activated.

System Resource Alert

This feature is available when used with Intel's LANDesk Client Manager (optional). It is used to notify the user of certain system events. For example, if the system is running low on virtual memory and there is insufficient hard drive space for saving the data, you can be alerted of the potential problem.

Hardware BIOS Virus Protection

The system BIOS is protected by hardware so that no virus can infect the BIOS area. The user can only change the BIOS content through the flash utility provided by SUPERMICRO. This feature can prevent viruses from infecting the BIOS area and destroying valuable data.

Auto-Switching Voltage Regulator for the CPU Core

The auto-switching voltage regulator for the CPU core can support up to 20A of current and auto-sense voltage IDs ranging from 1.3v to 3.5v. This will allow the regulator to run cooler and thus make the system more stable.

1-5 ACPI/PC99 Features

ACPI is an acronym meaning "Advanced Configuration and Power Interface." The ACPI specification defines a flexible and abstract hardware interface that provides a standard way to integrate power management features throughout a PC system, including its hardware, operating system and application software. This enables the system to automatically turn on and off peripherals such as CD-ROMs, network cards, hard disk drives and printers. This also includes consumer devices connected to the PC such as VCRs, TVs, telephones and stereos.

In addition to enabling operating system-directed power management, ACPI provides a generic system event mechanism for Plug and Play and an operating system-independent interface for configuration control. ACPI leverages the Plug and Play BIOS data structures while providing a processor architecture-independent implementation that is compatible with Windows 98, Windows NT and Windows 2000. You can check to see if ACPI has been properly installed by looking for it in the Device Manager, which is located in the "Control Panel" in Windows.

Microsoft OnNow

The OnNow design initiative is a comprehensive, system-wide approach to system and device power control. "OnNow" is a term for a PC that is always on but appears to be off and responds immediately to user or other requests.

Slow Blinking LED for Suspend-State Indicator

When the CPU goes into a suspend state, the chassis power LED will start blinking to indicate that the CPU is in suspend mode. The user can then press any key on the system's keyboard to awaken the CPU, at which time the LED will stop blinking and remain on.

USB Keyboard

If a USB keyboard is the only keyboard on the system, it can be enabled to function like a standard feature keyboard during system boot-up.

Real Time Clock Wake-Up Alarm

Although the PC may be perceived to be off when not in use, it is still capable of responding to preset wake-up events. In the BIOS, the user can set a timer to awaken the system at a predetermined time.

Main Switch Override Mechanism

When an ATX power supply is used, the power button can function as a system suspend button. With this feature enabled, the system will enter a SoftOff state when the user depresses the power button. The monitor will be suspended and the hard drive will spin down. Depressing the power button again will cause the whole system to awaken. During the SoftOff state, the ATX power supply provides power to keep the minimum required circuitry in the system alive. In case the system malfunctions and you want to turn off the power, just depress and hold the power button for four seconds. This will turn off the system completely with no main power provided to the motherboard.

External Modem Ring-On

Wake-up events can be triggered by a device such as the external modem ringing when the system is in the SoftOff state. "External Modem Ring-On" must be an included feature on the installed modem card when this feature is desired and the corresponding setting must be enabled in the BIOS. Note that external modem ring-on can only be used with an ATX 2.01 (or above) compliant power supply.

Wake-On-LAN

Wake-On-LAN (WOL) is defined as the ability of a remote management application to power up a computer that is powered off. Remote PC setup, updates and asset tracking can occur after hours and on weekends so that daily LAN maintenance traffic can be kept to a minimum and LAN-system users are not needlessly interrupted during normal work hours. The motherboards have a 3-pin WOL header to connect to the 3-pin header on a Network Interface Card (NIC) that has WOL capability. Wake-On-LAN must be enabled in the BIOS. Note that Wake-On-Lan can only be used with an ATX 2.01 (or above) compliant power supply.

1-6 Power Supply

As with all computer products, a stable power source is necessary for proper and reliable operation. It is especially important for processors that have CPU clock rates of 1 GHz and above.

NOTE: Auxiliary 12v power (J23/24) is necessary to support Intel Xeon CPUs. Failure to provide such extra power will result in the CPUs becoming unstable after only a few minutes of operation. See Section 2-6 for details on connecting the power supply cables.

The SUPER P4DC6/P4DC6+/P4DC6+II/P4DCE/P4DCE+/P4DCE+II accommodates ATX power supplies. Although most power supplies generally meet the specifications required by the CPU, some are inadequate. You should use one that will supply at least 400W of power and includes the additional +12V, 8-pin and 4-pin power connectors - an even higher wattage power supply is recommended for high-load configurations. Your power supply must also supply 1.5A for the LAN port. It is strongly recommended that you use a high quality power supply that meets ATX power supply specification 2.02 or above. It must also be SSI compliant (info at <http://www.ssiforum.org/>). Additionally, in areas where noisy power transmission is present, you may choose to install a line filter to shield the computer from noise. It is recommended that you also install a power surge protector to help avoid problems caused by power surges.

1-7 Super I/O

The functions of the disk drive adapter for the Super I/O chip include a floppy disk drive controller that is compatible with industry standard 82077/765, a data separator, write pre-compensation circuitry, decode logic, data rate selection, a clock generator, drive interface control logic and interrupt and DMA logic. The wide range of functions integrated onto the Super I/O greatly reduces the number of components required for interfacing with floppy disk drives.

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It also provides two high-speed, 16550 compatible serial communication ports (UARTs), one of which supports serial infrared communication. Each UART includes a 16-byte send/receive FIFO, a programmable baud rate generator, complete modem control capability and a processor interrupt system. Both UARTs provide legacy speed with a baud rate of up to 115.2 Kbps as well as an advanced speed with baud rates of 250 Kbps, 500 Kbps or 1 Mbps to support higher speed modems.

The Super I/O supports one of the following: PC-compatible printer port (SPP), bi-directional printer port (BPP), Enhanced Parallel Port (EPP) or Extended Capabilities Port (ECP). The Super I/O provides functions that comply with ACPI (Advanced Configuration and Power Interface), which includes support of legacy and ACPI power management through an SMI or SCI function pin. It also features auto power management to reduce power consumption.

The IRQs, DMAs and I/O space resources of the Super I/O can adjust flexibly to meet ISA PnP requirements, which support ACPI and Advanced Power Management (APM).

Notes

Chapter 2

Installation

2-1 Static-Sensitive Devices

Electric Static Discharge (ESD) can damage electronic components. To prevent damage to your system board, it is important to handle it very carefully. The following measures are generally sufficient to protect your equipment from ESD.

Precautions

- Use a grounded wrist strap designed to prevent static discharge.
- Touch a grounded metal object before removing the board from the anti-static bag.
- Handle the board by its edges only; do not touch its components, peripheral chips, memory modules or gold contacts.
- When handling chips or modules, avoid touching their pins.
- Put the motherboard and peripherals back into their antistatic bags when not in use.
- For grounding purposes, make sure your computer chassis provides excellent conductivity between the power supply, the case, the mounting fasteners and the motherboard.

Unpacking

The motherboard is shipped in antistatic packaging to avoid static damage. When unpacking the board, make sure the person handling it is static protected.

Installation Procedures

Follow the procedures as listed in the order below to install the motherboard into your system:

1. Install the processor and the heat sink.
2. Install the motherboard in the chassis.
3. Install the memory and add-on cards.
4. Finally, install the cables and drivers.

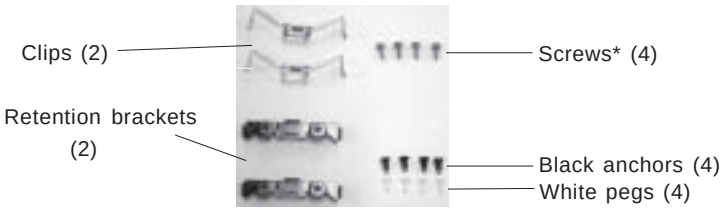
2-2 Processor and Heat Sink Installation



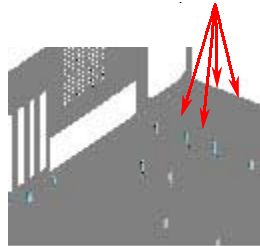
When handling the processor package, avoid placing direct pressure on the label area of the fan. Also, do not place the motherboard on a conductive surface, which can damage the BIOS battery and prevent the system from booting up.

IMPORTANT: Always connect the power cord last and always remove it before adding, removing or changing any hardware components. Make sure that you install the processor into the CPU socket before you install the CPU heat sink.

1. Locate the following components, which are included in the shipping package. **Note:** VRM modules must also be installed (P4DC6 and P4DCE only) - they are not included with the motherboard.

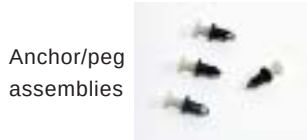


*These screws are to be used for mounting the motherboard to the back panel of a chassis that has four mounting holes (as shown on right).



For chassis that do not have four mounting holes, use the anchor/peg assemblies:

2. Insert the white pegs into the black anchors. Do not force the white pegs all the way in - about 1/3 of the white pegs should be inside the black anchors.



Anchor/peg assemblies

3. Place a retention bracket in the proper position and secure it by pressing two pegs into the retention holes until you hear a *click*. The clicking sound indicates that the peg is locked and secured.

Two pegs in position



One retention bracket in position

4. Secure the other retention bracket into position by repeating Step 3.



5. Lift the lever on the CPU socket: make sure you lift the lever completely or you will damage the CPU socket when power is applied.

Socket lever



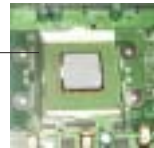
6. Install the CPU in the socket. Make sure that Pin 1 of the CPU is seated on Pin 1 of the socket (both corners are marked with a triangle). When using only one CPU, place it into CPU socket #1 (CPU socket #2 is automatically disabled if only one CPU is used).

Pin 1



7. Press the lever down until you hear it *click* into the locked position.

Socket lever in locked position



8. Apply the proper amount of thermal glue to the CPU die and place the heat sink on top of the CPU.

Heat sink

CPU



9. Secure the heat sink by locking the retention clips into their proper position.

Retention clip



10. Connect the three wires of the CPU fan to the CPU fan connector.

CPU fan wires

CPU fan connector





Warning! Make sure you lift the lever completely when installing the CPU. If the lever is only partly raised, damage to the socket or CPU may result.

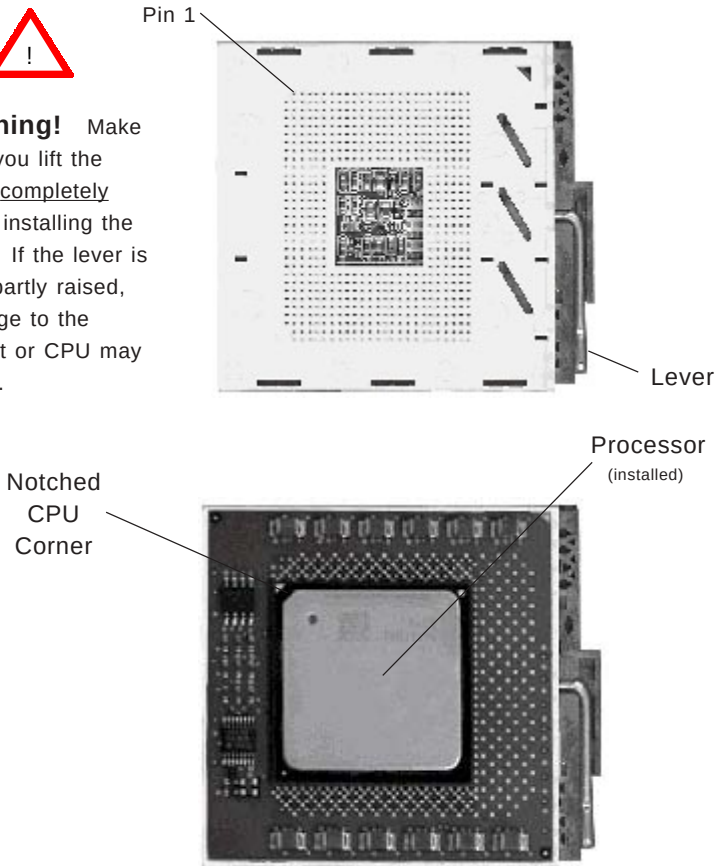


**Figure 2-1. PGA 603-Pin Socket:
Empty and with Processor Installed**

2-3 Mounting the Motherboard in the Chassis

All motherboards have standard mounting holes to fit different types of chassis. Chassis may include a variety of mounting fasteners made of metal or plastic. Although a chassis may have both types, metal fasteners are the most highly recommended because they ground the motherboard to the chassis. For this reason, it is best to use as many metal fasteners as possible.

2-4 Installing RIMMs

CAUTION

Exercise extreme care when installing or removing RIMM modules to prevent any possible damage.

Note: Check the Supramicro web site for a list of recommended memory modules:

http://www.supramicro.com/TECHSUPPORT/FAQs/Memory_vendors.htm

RIMM Installation (See Figures 2-2 and 2-3)

1. Insert a pair of RDRAM modules (of the same type and size) into the two RIMM slots of Bank 0. If needed, insert another pair of RDRAMs (of the same type and size) into both slots of Bank1. If you populate only the two slots of Bank0, then you need to populate both slots of Bank1with "Continuity Modules" to close the signal loop. See "RAMBUS Support" below for details on supported memory.
2. Insert each RDRAM module vertically into its slot. Pay attention to the two notches along the bottom of the module to prevent inserting the module incorrectly.
3. Gently press down on the RDRAM module until it snaps into place.
4. The P4DC6/P4DC6+/P4DC6+II/P4DCE/P4DCE+/P4DCE+II will support two (2) or four (4) 600 or 800 MHz 184-pin RDRAM modules for a total of up to 2 GB of system memory. Both ECC (Error Checking Correction) and Parity Checking are supported.

RAMBUS Support (Important!)

The Memory Controller Hub (MCH) enables the use of RAMBUS in the RIMM slots on the P4DC6/P4DC6+/P4DC6+II/P4DCE/P4DCE+/P4DCE+II. This hub supports both ECC and non-ECC type memory, but you cannot mix both types. (Check the Memory ECC Mode BIOS setting to enable the use of ECC. See Section 1-2 for more on the MCH.)

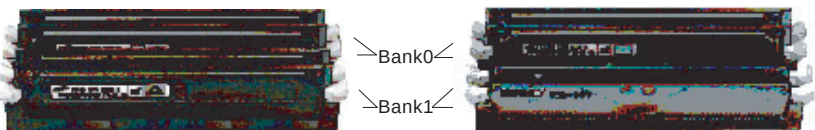
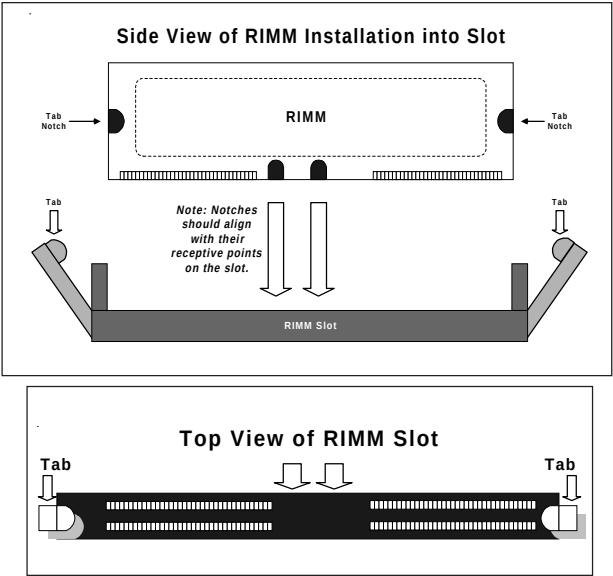


**Figure 2-2. Left: Four RIMMs in Banks 0 and 1
Right: Two RIMMs in Bank0 and Two Continuity Modules in Bank1**

Figure 2-3. RIMM Installation

To Install: With the tabs pulled outward, insert the RIMM module vertically and press straight down until it snaps into place. Pay attention to the alignment of the two notches.



To Remove: Use your thumbs to gently push out the tabs at both ends of the module. This should release it from the slot.

2-5 Port/Control Panel Connector Locations

The I/O ports are color coded in conformance with the PC99 specification to make setting up your system easier. See Figure 2-4 (below) for the colors and locations of the various I/O ports.

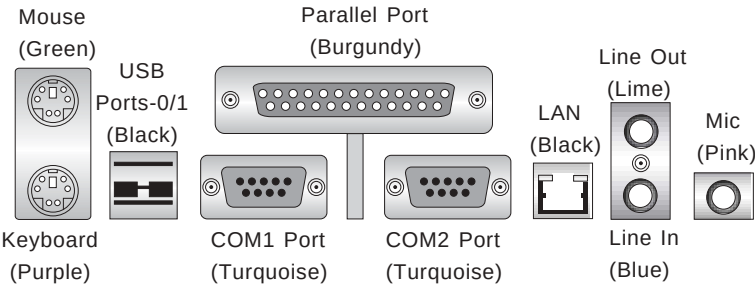


Figure 2-4. I/O Port Locations and Definitions

Front Control Panel

JF1 contains header pins for various front control panel connectors. See Figure 2-5 for the pin locations of the Power LED, IDE LED, Power On, Reset, USB Keyboard, the 5v System Bus, Fan Failure LED, Power Failure LED, Network Interface Card LED, I2C LED, Chassis Intrusion, Keyboard Lock, Overheat and Speaker headers, which are all located on JF1. Refer to the following section for details.

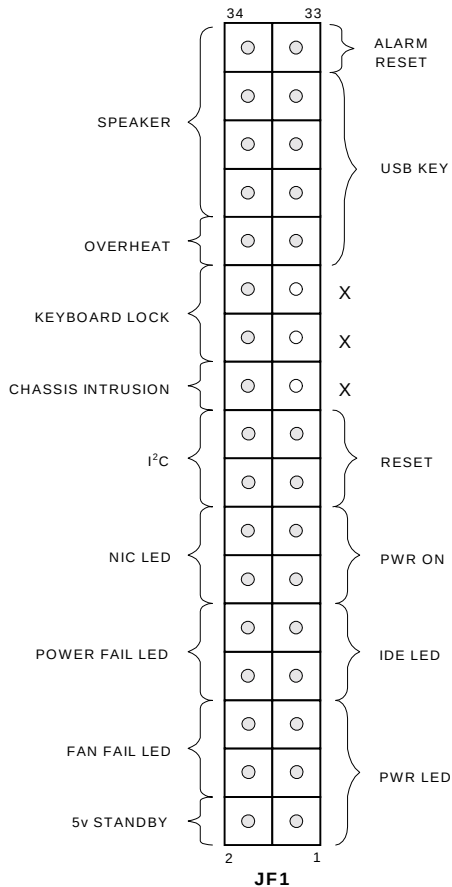
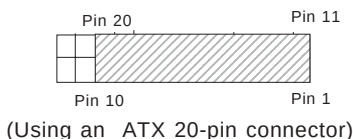
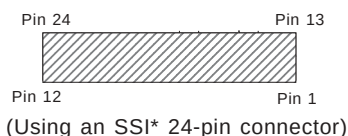


Figure 2-5. Front Control Panel Connectors

2-6 Connecting Cables (see previous page for locations)

Power Supply Connector

The primary power supply connector on the P4DC6/P4DC6+/P4DC6+II/P4DCE/P4DCE+/P4DCE+II meets the SSI (Superset ATX) 24-pin specification and also supports an ATX 20-pin connector.



Important !! The P4DC6/P4DC6+/P4DC6+II/P4DCE/P4DCE+/P4DCE+II must be connected to supplemental 12v power with the 4-pin J23 connector *and* the 8-pin J24 connector. Failure to use a power supply without such supplemental 12v power will result in CPU instability after only a few minutes of operation.

* SSI = Server System Infrastructure, a specification for chassis power supplies. Get more info at <http://www.ssiforum.org>

Table 2-1a
ATX Power Supply 24-pin Connector
Pin Definitions

Pin Number	Definition	Pin Number	Definition
13	+3.3v	1	+3.3v
14	-12v	2	+3.3v
15	GND	3	GND
16	PS_ON#	4	+5v
17	GND	5	GND
18	GND	6	+5v
19	GND	7	GND
20	Res(NC)	8	PWR_OK
21	+5v	9	5vSB
22	+5v	10	+12v
23	+5v	11	+12v
24	GND	12	+3.3v

Table 2-1b
ATX Power Supply 20-pin Connector
Pin Definitions

Pin Number	Definition	Pin Number	Definition
11	+3.3v	1	+3.3v
12	-12v	2	+3.3v
13	GND	3	GND
14	PS_ON	4	+5v
15	GND	5	GND
16	GND	6	+5v
17	GND	7	GND
18	-5v	8	PW-OK
19	+5v	9	5vSB
20	+5v	10	+12v

Table 2-1c
4-Pin +12v Power Supply
Connector (J23)

Required
connection

Pins	Definition
1 & 2	Ground
3 & 4	+12v

Table 2-1d
8-Pin +12v Power Supply
Connector (J24)

Required
connection

Pins	Definition
1 thru 4	Ground
5 thru 8	+12v

Table 2-1e
P/S Wire Definitions

Color	Definition
Orange	+3.3v
Black	Ground
Red	5v
White	Power OK
Yellow	+12v
Purple	5v standby
Brown	-5v

(For reference only)

PWR LED

The power LED connection is located on pins 1, 3 and 5 of JF1. This connector attaches to the LED on the chassis that indicates the computer is powered on. See Table 2-2 for pin definitions.

Table 2-2
Power LED Pin
Definitions (JF1)

Pin Number	Definition
1	+3.3v
3	NC
5	Signal

IDE Hard Drive LED

The hard drive LED connection is located on pins 7 and 9 of JF1. Attach the IDE hard drive LED cable to these pins to display IDE hard drive activity. See Table 2-3 for pin definitions.

Table 2-3
IDE LED Pin
Definitions (JF1)

Pin Number	Definition
7	+5v
9	Signal

PWR_ON

The PW_ON connection is located on pins 11 and 13 of JF1. Momentarily contacting both pins will power on/off the system. The user can also configure this button to function as a suspend button (see the "Power Button Mode" setting in BIOS). To turn the power off when set to suspend mode, hold down the power button for at least four seconds. See Table 2-4 for pin definitions.

Table 2-4
PW_ON Pin
Definitions (JF1)

Pin Number	Definition
11	PWR_ON
13	Ground

Reset

The reset connection is located on pins 15 and 17 of JF1. This connector attaches to the hardware reset switch on the computer chassis. See Table 2-5 for pin definitions.

Table 2-5
Reset Pin
Definitions (JF1)

Pin Number	Definition
15	Reset
17	Ground

USB Keyboard

If you are using a USB keyboard, connect it to pins 25, 27, 29, 31 and 33 of JF1. See Table 2-6 for pin definitions.

Table 2-6
USB Keyboard Pin Definitions
(JF1)

Pin Number	Definition
25	USB Power
27	USB Negative
29	USB Positive
31	Ground

Alarm Reset

Pin 33 of JF1 can be used to attach an alarm reset switch to your chassis. See Table 2-7 for pin definition.

Table 2-7
Alarm Reset Pin
Definitions (JF1)

Pin Number	Definition
33	Reset Signal

Fan Fail LED

Connect the proper fan cable to pins 4 and 6 of JF1 for LED indication of a fan failure. You will need a fan fail cable (not included) to use this connection. See Table 2-8 for pin definitions.

Table 2-8
Fan Fail LED Pin
Definitions (JF1)

Pin Number	Definition
4	5v
6	Signal

Power Fail LED

Connect the proper cable to pins 8 and 10 of JF1 for LED indication of a power failure. You will need the proper power cable (not included) to use this connection. See Table 2-9 for pin definitions.

Table 2-9
Power Fail LED Pin
Definitions (JF1)

Pin Number	Definition
8	5v
10	Signal

NIC LED

The Network Interface Controller LED connection is located on pins 12 and 14 of JF1. Attach the NIC LED cable to these pins to display network activity. See Table 2-10 for pin definitions.

Table 2-10
Power Fail LED Pin
Definitions (JF1)

Pin Number	Definition
12	3.3v Sby
14	Signal

I²C

The I²C connection is located on pins 16 and 18 of JF1. See Table 2-11 for pin definitions.

Table 2-11
I²C Pin Definitions
(JF1)

Pin Number	Definition
16	Bus Data
18	Bus Clock

Chassis Intrusion

The chassis intrusion header is located on pin 20 of JF1. See the board layouts in Chapter 1 for its location. See Table 2-12 for pin definition.

Table 2-12
Chassis Intrusion Pin
Definitions (JF1)

Pin Number	Definition
20	Intrusion Input

Keyboard Lock

The keyboard lock connection is located on pins 22 and 24 of JF1. See Table 2-13 for pin definitions.

Table 2-13
Keyboard Lock Pin Definitions (JF1)

Pin Number	Function	Definition
22	Keylock	Keyboard inhibit +5v Black wire
24	Ground	

Overheat

A chassis overheat header is located on pin 26 of JF1. See Table 2-14 for pin definitions.

Table 2-14
Overheat Pin Definitions
(JF1)

Pin Number	Definition
26	Overheat Input

Speaker

The speaker connector is located on pins 28, 30, 32 and 34 of JF1. See Table 2-15 for pin definitions.

Table 2-15
Speaker Pin Definitions (JF1)

Pin Number	Function	Definition
28	Power	3.3v
30	NC	NC
32	NC	NC
34	Spkr Out	Data

(Note: NC indicates no-connection.)

ATX PS/2 Keyboard and PS/2 Mouse Ports

The ATX PS/2 keyboard and the PS/2 mouse are located at J17. See Table 2-16 for pin definitions. (The mouse port is above the keyboard port. See Figure 2-4 for locations.)

Table 2-16
PS/2 Keyboard
and Mouse Port
Pin Definitions
(J17)

Pin Number	Definition
1	Data
2	NC
3	Ground
4	VCC
5	Clock
6	NC

Universal Serial Bus (USB)

Two Universal Serial Bus connectors (USB0 and USB1) are located at J18 and J19. See Table 2-17 for pin definitions. Your motherboard also provides support for two additional USB ports: the USB2 (J20) and USB3 (J29) headers are located near the CNR slot.

Note: If you have the USB on JF1 connected you cannot use USB2.

Table 2-17
Universal Serial Bus Pin Definitions
J18 J19

Pin#	Definition	Pin#	Definition
1	+5v	1	+5v
2	P0-	2	P0-
3	P0+	3	P0+
4	Ground	4	Ground

(USB 2-J20 & USB3-J29)

Pin Number	Definition
1	+5V
2	PO-
3	PO+
4	Ground
5	Ground

Serial Ports

Two serial connectors are provided on your board: COM1 (J16) and COM2 (J22). See Table 2-18 for pin definitions.

Table 2-18
Serial Port Pin Definitions COM1-J16 & COM2-J22

Pin Number	Definition	Pin Number	Definition
1	CD	6	DSR
2	RD	7	RTS
3	TD	8	CTS
4	DTR	9	RI
5	Ground	10	NC

Note: Pin 10 is included on the header but not on the port.

Wake-On-LAN

The Wake-On-LAN header is marked WOL. Refer to Table 2-19 for pin definitions. You must enable the LAN Wake-Up setting in BIOS to use this function. (You must also have a LAN card with a Wake-on-LAN connector and cable to use this feature.)

Table 2-19
Wake-On-LAN Pin
Definitions (WOL)

Pin Number	Definition
1	+5v Standby
2	Ground
3	Wake-up

CD Headers

There are two CD headers of different sizes on the motherboard for audio CD playback. You must connect an audio cable from your CD player to the header that fits your cable's connector. Refer to Table 2-20 for pin definitions.

Table 2-20a
Audio CD Header Pin Definitions (CD1)

Pin Number	Definition
1	Left Stereo Signal
2	Ground
3	Ground
4	Right Stereo Signal

Table 2-20b
Audio CD Header Pin Definitions (CD2)

Pin Number	Definition
1	Right Stereo Signal
2	Ground
3	Ground
4	Left Stereo Signal

Fan Headers*

The CPU fans, chassis fans and thermal control fan headers are designated CPU FAN #1/#2, Chassis Fan 1/2/3/4 and OH Fan respectively. Refer to Table 2-21 for pin definitions.

Table 2-21
Fan Header (CPU Fan 1-2, Chassis Fan 1-4, OH Fan) Pin Definitions

Pin Number	Definition
1	Ground (black)
2	+12V (red)
3	Tachometer

*Caution: These fan headers are for DC power only.

Overheat LED (JOH)

The JOH header is used to connect an LED to provide warning of chassis overheating. It is located near the microphone connector. Refer to Table 2-22 for pin definitions.

Table 2-22
Overheat LED Pin Definitions (JOH)

Pin Number	Definition
1	12vDC
2	OH Active

Infrared Connector

The infrared connector is located at J32. See Table 2-23 for pin definitions. See the Technical Support section of our web site for information on the infrared devices you can connect to the system.

Table 2-23
Infrared Pin Definitions (J32)

Pin Number	Definition
1	+5v
2	Key
3	IRRX
4	Ground
5	IRTX

Wake-On-Ring

The Wake-On-Ring header is designated as JWOR on the P4DC6/P4DC6+/P4DC6+II/P4DCE/P4DCE+/P4DCE+II. This function allows your computer to receive and be "awakened" by an incoming call when in the suspend state. Refer to Table 2-24 for pin definitions. You must also have a WOR card and cable to use WOR.

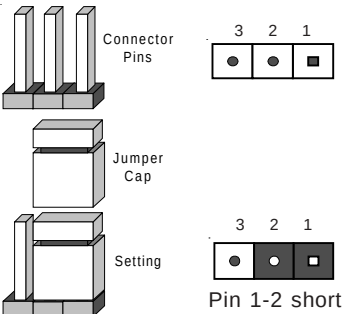
Table 2-24
Wake-On-Ring Pin
Definitions (JWOR)

Pin Number	Definition
1	Ground
2	Wake-up

2-7 Jumper Settings

Explanation of Jumpers

To modify the operation of the motherboard, jumpers can be used to choose between optional settings. Jumpers create shorts between two pins to change the function of the connector they are located on. **Pin 1 is always identified with a square solder pad on the printed circuit board.** See the motherboard layout pages for jumper locations.



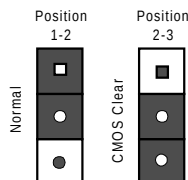
CMOS Clear

Refer to Table 2-25 for instructions on how to clear CMOS. Always remove the AC power cord from the system before clearing CMOS.

Note: For an ATX power supply, you must completely shut down the system, remove the AC power cord, and then use JBT1 to clear CMOS. Replace JBT1 back to the pin 1-2 position before powering up the system again. Do not use the PW_ON connector to clear CMOS.

Table 2-25
CMOS Clear Jumper Settings (JBT1)

Jumper Position	Definition
1-2	Normal
2-3	CMOS Clear



PCI 64 Speed Select (P4DC6+/P4DCE+/P4DC6+II/ P4DCE+II only)

Jumper JPA3 allows you to change the speed of the 64-bit PCI slot. The default setting is 66 MHz. **Note:** If you have installed a RAID card into the RAID adapter port (P4DC6+/P4DC6+II only) and a PCI slot into the 64-bit 66 MHz PCI slot, you must set this jumper to 33 MHz. Refer to Table 2-26 for jumper settings.

Table 2-26
64-bit PCI Speed Select
Jumper Settings (JPA3)

Jumper Position	Definition
Open	66 MHz
Closed	33 MHz

Keyboard Wake-Up

The JPWAKE jumper is used together with the Keyboard Wake-Up function in BIOS. Enable both the jumper and the BIOS setting to allow the system to be woken up by depressing a key on the keyboard. See Table 2-27 for jumper settings. JPWAKE is located near the keyboard and mouse ports.

Note: Your power supply must meet ATX specification 2.01 or higher and supply 720mA of standby power to use this feature.

Table 2-27
Keyboard Wake-Up
Jumper Settings
(JPWAKE)

Jumper Position	Definition
1-2	Disabled
2-3	Enabled

USB Wake-Up

Jumper JP39 is used in conjunction with the Keyboard Wake-Up function in BIOS when you wish to wake the system up with a USB keyboard that has been connected to a USB port (not header). Set JP39 to pins 1-2 to support USB keyboard wake-up and resume from ACPI S1 mode and pins 2-3 pins to support USB keyboard wake-up and resume from ACPI S3 mode. See Table 2-28 for jumper settings.

Note: Your power supply must provide 5v of standby voltage with at least 1A to use this feature.

Table 2-28
USB Wake-Up
Jumper Settings (JP39)

Jumper Position	Definition
1-2	5v
2-3	5v Standby

SCSI Enable/Disable (P4DC6/P4DC6+/P4DC6+II only)

The SCSI Termination jumper at JP34 allows you to enable or disable the onboard SCSI controller. The normal (default) position is on pins 1-2 to enable SCSI termination. See Table 2-29 for jumper settings.

Table 2-29
SCSI Enable/Disable
Jumper Settings
(JP34)

Jumper Position	Definition
Pins 1-2	Enabled
Pins 2-3	Disabled

SCSI Termination Enable/ Disable (P4DC6/P4DC6+/ P4DC6+II only)

Jumpers JPA1 and JPA2 allow you to enable or disable termination for the individual SCSI channels. Jumper JPA1 controls SCSI channel A and JPA2 controls SCSI channel B. The normal (default) setting is open to enable (terminate) both SCSI channels. If you wish to connect external SCSI devices, you should disable termination for the channel(s) you will be connecting them to. See Table 2-30 for jumper settings.

Table 2-30
**SCSI Termination Enable/
Disable Jumper Settings**
(JPA1, JPA2)

Jumper Position	Definition
Open	Enabled
Closed	Disabled

LAN Enable/Disable

Change the setting of jumper JP35 to enable or disable the onboard LAN or NIC (Network Interface Card) on the motherboard. See Table 2-31 for jumper settings. The default setting is enabled

Table 2-31
LAN (NIC)
Enable/Disable
Jumper Settings
(JP35)

Jumper Position	Definition
Pins 1-2	Enabled
Pins 2-3	Disabled

Power Supply Alarm Enable/Disable

The system can notify you in the event of a power supply failure. This feature assumes that three power supply units are installed in the chassis, with one acting as a backup. If you only have one or two power supply units installed, you should disable this (the default setting) with JP38 to prevent false alarms. See Table 2-32 for jumper settings.

Table 2-32
Power Supply
Alarm Enable/Disable
Jumper Settings (JP38)

Jumper Position	Definition
Open	Disabled
Closed	Enabled

Onboard Audio Enable/ Disable

AC'97 brings high quality audio to PCs. When enabled with JP4, audio is processed onboard. The disabled setting should be selected when you wish to use an PCI add-on card for audio. See Table 2-33 for jumper settings.

Table 2-33
AC97 Enable/Disable
Jumper Settings (JP4)

Jumper Position	Definition
1-2	Enabled
2-3	Disabled

2-8 Parallel Port, AGP, Floppy/Hard Disk and SCSI Connections

Use the following information to connect the floppy and hard disk drive cables.

- The floppy disk drive cable has seven twisted wires.
- A red mark on a wire typically designates the location of pin 1.
- A single floppy disk drive ribbon cable has 34 wires and two connectors to provide for two floppy disk drives. The connector with twisted wires always connects to drive A and the connector that does not have twisted wires always connects to drive B.
- The 80-wire ATA66/100 IDE hard disk drive cable that came with your system has two connectors to support two drives. This special cable should be used to take advantage of the speed this advanced technology offers. The blue connector connects to the onboard IDE connector interface and the other connector(s) to your hard drive(s). The middle connector is for the slave device and the remaining connector is for the master device. Consult the documentation that came with your disk drive for details on actual jumper locations and settings for the hard disk drive.

Table 2-34
Parallel (Printer) Port Pin Definitions (J15)

Pin Number	Function	Pin Number	Function
1	Strobe-	2	Auto Feed-
3	Data Bit 0	4	Error-
5	Data Bit 1	6	Init-
7	Data Bit 2	8	SLCT IN-
9	Data Bit 3	10	GND
11	Data Bit 4	12	GND
13	Data Bit 5	14	GND
15	Data Bit 6	16	GND
17	Data Bit 7	18	GND
19	ACK	20	GND
21	BUSY	22	GND
23	PE	24	GND
25	SLCT	26	NC

Parallel Port Connector

The parallel port is designated as J15. See Table 2-34 for pin definitions.

Floppy Connector

The floppy connector is designated as JP5. See Table 2-35 for pin definitions.

Table 2-35
Floppy Connector Pin Definitions (JP5)

Pin Number	Function	Pin Number	Function
1	GND	2	FDHDIN
3	GND	4	Reserved
5	Key	6	FDEDIN
7	GND	8	Index-
9	GND	10	Motor Enable
11	GND	12	Drive Select B-
13	GND	14	Drive Select A-
15	GND	16	Motor Enable
17	GND	18	DIR-
19	GND	20	STEP-
21	GND	22	Write Data-
23	GND	24	Write Gate-
25	GND	26	Track 00-
27	GND	28	Write Protect-
29	GND	30	Read Data-
31	GND	32	Side 1 Select-
33	GND	34	Diskette

Table 2-36
IDE Connector Pin Definitions (J6, J7)

Pin Number	Function	Pin Number	Function
1	Reset IDE	2	GND
3	Host Data 7	4	Host Data 8
5	Host Data 6	6	Host Data 9
7	Host Data 5	8	Host Data 10
9	Host Data 4	10	Host Data 11
11	Host Data 3	12	Host Data 12
13	Host Data 2	14	Host Data 13
15	Host Data 1	16	Host Data 14
17	Host Data 0	18	Host Data 15
19	GND	20	Key
21	DRQ3	22	GND
23	I/O Write-	24	GND
25	I/O Read-	26	GND
27	IOCHRDY	28	BALE
29	DACK3-	30	GND
31	IRQ14	32	IOCS16-
33	Addr 1	34	GND
35	Addr 0	36	Addr 2
37	Chip Select 0	38	Chip Select 1-
39	Activity	40	GND

IDE Connectors

There are no jumpers to configure the onboard IDE interfaces J6 and J7. Refer to Table 2-36 for pin definitions. You must use the ATA100/66 cable included with your system to benefit from the ATA100/66 technology.

AGP Slot

The AGP Pro slot is backward compatible with AGP Pro and 4xAGP graphics cards, which have fewer pins than AGP Pro cards. Because of this, care must be taken when installing a graphics card into this slot, as doing so incorrectly can damage your motherboard. For AGP Pro cards, you should remove the orange sticker covering one end of the slot. For other cards, leave this sticker in place and make sure your card does not plug into the section it covers. A general rule of thumb is to make sure your card fills the section of pins nearer the center of the motherboard first, then the end toward the edge of the motherboard if there are more pins not seated. If the I/O shield of your card is flush with the edge of the motherboard, the card should be inserted correctly.



50-pin Legacy SCSI Connector Ultra Wide SCSI Connector (P4DC6/P4DC6+/P4DC6+II only)

Refer to Table 2-37 for pin definitions for the 50-pin Legacy SCSI connector located at JA3.

Table 2-37
50-pin Legacy SCSI Connector Pin Definitions (JA3)

Pin Number	Function	Pin Number	Function
1	GND	26	-DB (0)
2	GND	27	-DB (1)
3	GND	28	-DB (2)
4	GND	29	-DB (3)
5	GND	30	-DB (4)
6	GND	31	-DB (5)
7	GND	32	-DB (6)
8	GND	33	-DB (7)
9	GND	34	-DB (P)
10	GND	35	GND
11	GND	36	GND
12	Reserved	37	Reserved
13	Open	38	Termpwr
14	Reserved	39	Reserved
15	GND	40	GND
16	GND	41	-ATN
17	GND	42	GND
18	GND	43	-BSY
19	GND	44	-ACK
20	GND	45	-RST
21	GND	46	-MSG
22	GND	47	-SEL
23	GND	48	-C/D
24	GND	49	-REQ
25	GND	50	-I/O